

P/3255-62

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of

Hugues BERTON, et al.

Date: March 21, 2002

Serial No.: not yet known

Group Art Unit: not yet known

Filed: herewith

Examiner: not yet known

For: CATHODIC PROTECTION DEVICE FOR FLEXIBLE PIPES

U.S. Patent and Trademark Office
P.O. Box 2327
Arlington, VA 22202

PRELIMINARY AMENDMENT

Prior to examination, please amend the application as follows.

FEE CALCULATION

Any additional fee required has been calculated as follows:

_____ If checked, "Small Entity" status is claimed.

	NO. CLAIMS AFTER AMENDMENT		HIGHEST NO. PREVIOUSLY PAID FOR		EXTRA PRESENT		RATE	ADDIT. FEE
TOTAL	12	MINUS	20	* =	0	X	(\$9 SE or \$18)	\$0
INDEP.	1	MINUS	3	** =	0	X	(\$42 SE or \$84)	\$0
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM						X	(\$140 SE or \$280)	\$0

* not less than 20 ** not less than 3

TOTAL \$ 0

In the event the actual fee is greater than the payment submitted or is inadvertently not enclosed or if any additional fee during the prosecution of this application is not paid, the Patent Office is authorized to charge the underpayment to Deposit Account No. 15-0700.

REMARKS/ARGUMENT

This Preliminary Amendment is being submitted to change the multiple dependent claims to single dependent claims in order to reduce the government filing fee.

EXPRESS MAIL CERTIFICATE

I hereby certify that this correspondence is being deposited with the United States Postal Service as Express Mail Post Office to Addressee (mail label #EL924372709US) in an envelope addressed to: U.S. Patent and Trademark Office, P.O. Box 2327, Arlington, VA 22202 on March 21, 2002:

Dorothy Jenkins

Name of applicant, assignee or
Registered Representative

Dorothy Jenkins

Signature

March 21, 2002

Date of Signature

RCF:dmk

Respectfully submitted,

Robert C. Faber

Robert C. Faber

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APPENDIX A
“CLEAN” VERSION OF EACH PARAGRAPH/SECTION/CLAIM
37 C.F.R. § 1.121(b)(ii) AND (c)(i)

CLAIMS (with indication of amended or new):

AMENDED 1. Cathodic protection device for a subsea flexible pipe for transporting fluid, the flexible pipe comprising a plastic sealing sheath and an inner plastic sheath which define an annular space in which structural elements are placed, the said structural elements comprising at least one armour ply consisting of metal wires wound helically with a long pitch, a end fitting being fitted at each end of the said flexible pipe, the device comprising at least one external anode electrically connected by connection means to the said armour ply, characterized in that the anode is placed in an intermediate region of the flexible pipe distal from the said end fittings, the connection means connecting the anode to at least one of the metal wires in the said intermediate region.

AMENDED 2. Cathodic protection device according to Claim 1, wherein the armour ply connected to the anode is adjacent to the outer plastic sealing sheath.

AMENDED 3. Device according to Claim 1, in which the flexible pipe comprises several armour plies and wherein the anode is electrically connected to at least one single metal wire of each armour ply.

AMENDED 4. Device according to Claim 1, wherein the connection means consist of at least one penetrating metal shank which is in contact with the metal wire or wires to be connected to the anode.

AMENDED 5. Device according to Claim 1, wherein the anode is fastened to a clamp which is clamped around the flexible pipe.

AMENDED 6. Device according to Claim 5, wherein the clamp comprises a penetrating internal part which is in contact with the metal wire or wires to be connected to the anode.

AMENDED 7. Device according to Claim 5, wherein the clamp comprises several penetrating bolts uniformly distributed around the periphery of the flexible pipe and each constituting one of the connection means.

AMENDED 8. Device according to Claim 7, wherein contact between the lower end of each bolt on an armour wire is provided by brazing, welding or adhesive bonding using a conductive adhesive.

AMENDED 9. Device according to Claim 1, wherein at least the outermost armour ply comprises at least one tapped part into which a threaded shank of one of the bolts is inserted by screwing.

AMENDED 10. Device according to Claim 1, wherein when the flexible pipe comprises several armour plies separated by insulating intermediate tapes, the connection means connect the anode to the innermost armour ply lying beneath the last insulating tape.

AMENDED 12. Device according to Claim 1, characterized in that an anode, which is fastened to a first support clamp, is fitted in the intermediate region, the connection between the anode and at least one metal wire being made through a second connection clamp located near the first clamp.

ABSTRACT:

The flexible pipe comprises a plastic sealing sheath and an inner plastic sheath which define an annular space in which structural elements are placed, the said structural elements comprising at least one armour ply consisting of metal wires wound helically with a long pitch, a end fitting being fitted at each end of the said flexible pipe, the device comprising at least one external anode electronically connected by connection means to the said armour ply, and it is characterized in that the anode is placed in an intermediate region of the flexible pipe distal from

the said end fittings, the connection means connecting the anode to at least one of the metal wires in the said intermediate region.

APPENDIX B
VERSION WITH MARKINGS TO SHOW CHANGES MADE
37 C.F.R. § 1.121(b)(iii) AND (c)(ii)

CLAIMS:

1. Cathodic protection device for a subsea flexible pipe [(1)] for transporting fluid, the flexible pipe comprising a plastic sealing sheath [(2)] and an inner plastic sheath [(8)] which define an annular space in which structural elements are placed, the said structural elements comprising at least one armour ply [(3)] consisting of metal wires [(41)] wound helically with a long pitch, a end fitting [(12, 13)] being fitted at each end of the said flexible pipe [(1)], the device [(14)] comprising at least one external anode [(17)] electrically connected by connection means to the said armour ply, characterized in that the anode [(17)] is placed in an intermediate region [(40)] of the flexible pipe [(1)] distal from the said end fittings, the connection means [(23, 25)] connecting the anode to at least one of the metal wires in the said intermediate region.

2. Cathodic protection device according to Claim 1, wherein [characterized in that] the armour ply [(4)] connected to the anode is adjacent to the outer plastic sealing sheath [(2)].

3. Device according to Claim 1, in which the flexible pipe comprises several armour plies [(4, 5)] and wherein [characterized in that] the anode is electrically connected to at least one single metal wire [(41)] of each armour ply [(4, 5)].

4. Device according to Claim 1, wherein [one of Claims 1 to 3, characterized in that] the connection means [(23, 25)] consist of at least one penetrating metal shank [(22)] which is in contact with the metal wire or wires [(41)] to be connected to the anode [(17)].

5. Device according to Claim 1, wherein [one of Claims 1 to 4, characterized in that] the anode [(17)] is fastened to a clamp [(15)] which is clamped around the flexible pipe [(1)].

6. Device according to Claim 5, wherein [characterized in that] the clamp [(15)] comprises a penetrating internal part [(25)] which is in contact with the metal wire or wires [(41)] to be connected to the anode.

7. Device according to Claim 5, wherein [characterized in that] the clamp [(15)] comprises several penetrating bolts [(23)] uniformly distributed around the periphery of the flexible pipe [(1)] and each constituting one of the connection means.

8. Device according to Claim 7, wherein [characterized in that] contact between the lower end of each bolt [(23)] on an armour wire [(41)] is provided by brazing, welding or adhesive bonding using a conductive adhesive.

9. Device according to Claim 1, wherein [Claims 1 to 3 and 7, characterized in that] at least the outermost armour ply [(4)] comprises at least one tapped part [(21)] into which a threaded shank of one of the bolts [(23)] is inserted by screwing.

10. Device according to Claim 1, wherein [either of Claims 1 and 3, characterized in that] when the flexible pipe comprises several armour plies [(4, 5)] separated by insulating intermediate tapes [(11)], the connection means connect the anode [(17)] to the innermost armour ply [(5)] lying beneath the last insulating tape [(11)].

12. Device according to Claim 1, characterized in that an anode [(17)], which is fastened to a first support clamp [(29)], is fitted in the intermediate region [(40)], the connection between the anode [(17)] and at least one metal wire [(41)] being made through a second connection clamp [(31)] located near the first clamp [(29)].

ABSTRACT:

The flexible pipe comprises a plastic sealing sheath and an inner plastic sheath which define an annular space in which structural elements are placed, the said structural elements comprising at

least one armour ply consisting of metal wires wound helically with a long pitch, a end fitting [(12, 13)] being fitted at each end of the said flexible pipe [(1)], the device [(14)] comprising at least one external anode electronically connected by connection means to the said armour ply, and it is characterized in that the anode is placed in an intermediate region [(40)] of the flexible pipe [(1)] distal from the said end fittings, the connection means connecting the anode to at least one of the metal wires in the said intermediate region.

[Applications especially to long flexible pipes resting on the seabed.]

Figure 1.]

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P/3255-62

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of

Hugues BERTON, et al.

Date: June 13, 2002

Serial No.: 10/088,944

Group Art Unit: Unknown

Filed: March 21, 2002

Examiner: Unknown

For: CATHODIC PROTECTION DEVICE FOR FLEXIBLE PIPES

Asst. Commissioner for Patents
Washington, D.C. 20231
BOX: PCT

SECOND PRELIMINARY AMENDMENT

Prior to examination, please amend the application as follows.

FEE CALCULATION

Any additional fee required has been calculated as follows:

_____ If checked, "Small Entity" status is claimed.

NO. CLAIMS AFTER AMENDMENT		HIGHEST NO. PREVIOUSLY PAID FOR		EXTRA PRESENT		RATE	ADDIT. FEE
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INDEP.	1	MINUS	3	** =	0	X (\$42 SE or \$84)	\$ 0
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM					X	(\$140 SE or \$280)	\$ 0

* not less than 20 ** not less than 3

TOTAL \$ 0

In the event the actual fee is greater than the payment submitted or is inadvertently not enclosed or if any additional fee during the prosecution of this application is not paid, the Patent Office is authorized to charge the underpayment to Deposit Account No. 15-0700.

REMARKS/ARGUMENT

This Preliminary Amendment is being submitted to correct the specification and claims to a typical United States format.

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as First Class Mail in an envelope addressed to: Asst. Commissioner for Patents, Washington, D.C. 20231, on June 13, 2002:

Robert C. Faber

Name of Person Mailing Correspondence

Robert C. Faber

Signature

June 13, 2002

Date of Signature

Respectfully submitted,

Robert C. Faber

Robert C. Faber

Registration No.: 24,322

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RCF:ck:sds:dmk:sds

APPENDIX A
"CLEAN" VERSION OF EACH PARAGRAPH/SECTION/CLAIM
37 C.F.R. § 1.121(b)(ii) AND (c)(i)

SPECIFICATION:

Page 1, between lines 1 (title) and 2, insert the heading:

Background of the Invention

Page 4, between lines 24 and 25, insert the heading:

Summary of the Invention

Page 5, between lines 29 and 30, insert the heading:

Brief Description of the Drawings

Page 6, between lines 22 and 23, insert the heading:

Description of Preferred Embodiments

Replacement for the paragraph beginning at page 6, line 32 to page 7, line 20:

Whatever the type of flexible pipe, it comprises at least two armour plies, each consisting of metal wires wound helically with a long pitch and a small lay angle about the longitudinal axis of the flexible pipe, the two armour plies being crossed or wound in opposite directions. The metal wires 41 of each armour ply are generally in localized contact with each other at various points. Of course, the flexible pipe may comprise more than two armour plies, the result being that the winding of the wires constituting the armours produces thousands of points of contact between two consecutive armour plies, as shown schematically in Figure 6. In the example shown in Figure 7, the flexible pipe 1 comprises, from the outside inwards:

- an outer sealed polymeric sheath 2 which is exposed to seawater and/or in contact with the seabed when the flexible pipe is submerged in the sea;
- a group 3 of tensile armour plies comprising two armour plies 4 and 5 wound crosswise or in opposite directions with the same lay angle;

- a pressure vault 7;
- an inner polymeric sealing sheath 8; and
- a metal carcass 9 consisting of a winding with a short pitch close to 90°.

Replacement for the paragraph beginning at page 7, line 31 to page 8, line 18:

The device according to the invention is intended to be fitted on the spanning length of the flexible pipe, as shown in Figure 1. The expression "spanning length" is understood to mean the intermediate regions 40 of the flexible pipe which are relatively far from the end fittings 12 and 13 of the flexible pipe. The position of the intermediate regions 40 is referred to as being distal from the end fittings 12 or 13 of the flexible pipe. In the example shown in Figure 1, the flexible pipe has a length L of more than 6 kilometers, thereby requiring the use of two devices according to the invention, each being referenced in its entirety by 14. An intermediate region 40 in the present context is defined by that portion of flexible pipe surrounded by the device 14 plus, on each side of the device, a certain proximal portion of the flexible pipe. For a given length L' of a device 14, the intermediate region is from 4 to 5 times the length L', the regular intervals between the end fittings 12, 13 and the devices 14 being equal to L₁, each interval L₁ being determined according to the range of a cathodic protection anode system, which range being between 1.5 and 2 km.

CLAIMS (with indication of amended or new):

TWICE AMENDED 1. Cathodic protection device for a subsea flexible pipe for transporting fluid, the flexible pipe comprising an outer plastic sealing sheath and an inner plastic sheath inward of the outer sheath, the sheaths define an annular space between the outer and inner sheaths;

an end fitting fitted at each end of the flexible pipe; the pipe having an intermediate region distal from the end fittings;

structural elements placed in the annular space, the structural elements comprising at least one armor ply of metal wires wound helically with a long pitch;

the device comprising at least one external anode, the anode being placed in the intermediate region; and

a connection means electrically connecting the anode to at least one of the armor ply metal wires in the intermediate region of the flexible pipe distal from the end fittings.

TWICE AMENDED 3. Device according to Claim 1, wherein the flexible pipe comprises several of the armor plies and wherein the anode is electrically connected to at least one metal wire of each armor ply.

TWICE AMENDED 4. Device according to Claim 1, wherein the connection means comprises at least one penetrating metal shank which is in contact with the armor ply metal wire or wires which are to be connected to the anode.

TWICE AMENDED 5. Device according to Claim 1, further comprising a clamp which is clamped around the flexible pipe, and the anode is fastened to the clamp.

TWICE AMENDED 6. Device according to Claim 5, wherein the clamp comprises a penetrating internal part which is in contact with the armor ply metal wire or wires which are to be connected to the anode.

TWICE AMENDED 7. Device according to Claim 5, wherein the clamp comprises several penetrating bolts uniformly distributed around the periphery of the flexible pipe and each defining one of the connection means.

TWICE AMENDED 8. Device according to Claim 7, wherein each bolt has a lower end, and contact between the lower end of each bolt and one of the armor wires is provided by brazing, welding or adhesive bonding using a conductive adhesive.

TWICE AMENDED 10. Device according to Claim 1, wherein the flexible pipe comprises several of the armor plies separated by insulating intermediate tapes, the connection means connects the anode to the innermost armor ply lying beneath the insulating tape that is last inward.

TWICE AMENDED 12. Device according to Claim 5, wherein the clamp is fitted in the intermediate region, a second connection means clamp defining the connection means between the anode and at the at least one metal wire, the second connection means clamp being located near the clamp.

NEW 13. Device according to claim 10, wherein the connection means connects the anode to all of the armor plies.

NEW 14. Device according to claim 1, wherein the anode is of a metal having a reference potential lower than the immunity potential of the armor wires.

NEW 15. Device according to claim 14, wherein the armor plies are of steel and the anode is of aluminum or zinc.

ABSTRACT:

The flexible pipe comprises a plastic sealing sheath and an inner plastic sheath which define an annular space in which structural elements are placed. The structural elements comprising at least one armor ply consisting of metal wires wound helically with a long pitch are in the space. An end fitting is fitted at each end of the flexible pipe. At least one external anode electronically connected to at least one armor ply. The anode is placed in an intermediate region of the flexible pipe distal from the end fittings. A connection means connects the anode to at least one of the metal wires of the said armor ply in the intermediate region.

APPENDIX B
VERSION WITH MARKINGS TO SHOW CHANGES MADE
37 C.F.R. § 1.121(b)(iii) AND (c)(ii)

SPECIFICATION:

Paragraph at page 6, line 32 to page 7, line 20:

Whatever the type of flexible pipe, it comprises at least two armour plies, each consisting of metal wires wound helically with a long pitch and a small lay angle about the longitudinal axis of the flexible pipe, the two armour plies being crossed or wound in opposite directions. The metal wires 41 of each armour ply are generally in localized contact with each other at various points. Of course, the flexible pipe may comprise more than two armour plies, the result being that the winding of the wires constituting the armours produces thousands of points of contact between two consecutive armour plies, as shown schematically in Figure 6. In the [examples] example shown in Figure 7, the flexible pipe 1 comprises, from the outside inwards:

- an outer sealed polymeric sheath 2 which is exposed to seawater and/or in contact with the seabed when the flexible pipe is submerged in the sea;
- a group 3 of tensile armour plies comprising two armour plies 4 and 5 wound crosswise or in opposite directions with the same lay angle;
- a pressure vault 7;
- an inner polymeric sealing sheath 8; and
- a metal carcass 9 consisting of a winding with a short pitch close to 90°.

Paragraph at page 7, line 31 to page 8, line 18:

The device according to the invention is intended to be fitted on the spanning length of the flexible pipe, as shown in Figure 1. The expression "spanning length" is understood to mean the intermediate regions 40 of the flexible pipe which are relatively far from the end fittings 12 and 13 of the [said] flexible pipe. The position of the intermediate regions 40 is referred to as being distal from the end fittings 12 or 13 of the flexible pipe. In the example shown in Figure 1, the flexible pipe has a length L of more than 6 [kilometres] kilometers, thereby requiring the use of

two devices according to the invention, each being referenced in its entirety by 14. An intermediate region 40 in the present context is defined by that portion of flexible pipe surrounded by the device 14 plus, on each side of the device, a certain proximal portion of the flexible pipe. For a given length L' of a device 14, the intermediate region is from 4 to 5 times the length L' , the regular intervals between the end fittings 12, 13 and the devices 14 being equal to L_1 , each interval L_1 being determined according to the range of a cathodic protection anode system, which range being between 1.5 and 2 km.

CLAIMS:

TWICE AMENDED 1. Cathodic protection device for a subsea flexible pipe for transporting fluid, the flexible pipe comprising [a] an outer plastic sealing sheath and an inner plastic sheath [which] inward of the outer sheath, the sheaths define an annular space between the outer and inner sheaths; an end fitting at each end of the flexible pipe, the pipe having an intermediate region distal from the end fittings; [in which] structural elements [are] placed in the annular space, the [said] structural elements comprising at least one [armour] armor ply [consisting] of metal wires wound helically with a long pitch, [a end fitting being fitted at each end of the said flexible pipe,] the device comprising at least one external anode [electrically connected by connection means to the said armour ply], [characterized in that] the anode [is] being placed in [an] the intermediate region [of the flexible pipe distal from the said end fittings, the] and a connection means electrically connecting the anode to at least one of the armor ply metal wires in the [said] intermediate region of the flexible pipe distal from the end fittings.

TWICE AMENDED 3. Device according to Claim 1, [in which] wherein the flexible pipe comprises several [armour] of the armor plies and wherein the anode is electrically connected to at least one [single] metal wire of each [armour] armor ply.

TWICE AMENDED 4. Device according to Claim 1, wherein the connection means [consist of] comprises at least one penetrating metal shank which is in contact with the armor ply metal wire or wires which are to be connected to the anode.

TWICE AMENDED 5. Device according to Claim 1, [wherein the anode is fastened to] further comprising a clamp which is clamped around the flexible pipe, and the anode is fastened to the clamp.

TWICE AMENDED 6. Device according to Claim 5, wherein the clamp comprises a penetrating internal part which is in contact with the armor ply metal wire or wires which are to be connected to the anode.

TWICE AMENDED 7. Device according to Claim 5, wherein the clamp comprises several penetrating bolts uniformly distributed around the periphery of the flexible pipe and each [constituting] defining one of the connection means.

TWICE AMENDED 8. Device according to Claim 7, wherein each bolt has a lower end, and contact between the lower end of each bolt [on an armour wire] and one of the armor wires is provided by brazing, welding or adhesive bonding using a conductive adhesive.

TWICE AMENDED 10. Device according to Claim 1, wherein [when] the flexible pipe comprises several [armour] of the armor plies separated by insulating intermediate tapes, the connection means [connect] connects the anode to the innermost [armour] armor ply lying beneath the [last] insulating tape that is last inward.

TWICE AMENDED 12. Device according to Claim [1] 5, [characterized in that an anode, which is fastened to a first support] wherein the clamp[,] is fitted in the intermediate region, [the connection] a second connection means clamp defining the connection means between the anode and at the at least one metal wire, [being made through a] the second connection means clamp being located near the [first] clamp.

ABSTRACT:

The flexible pipe comprises a plastic sealing sheath and an inner plastic sheath which define an annular space in which structural elements are placed [, the said]. The structural elements comprising at least one [armour] armor ply consisting of metal wires wound helically with a long pitch are in the space. An [, an] end fitting [being] is fitted at each end of the [said] flexible pipe [, the device comprising at]. At least one external anode electronically connected [by connection means] to [the said armour ply, and it is characterized in that the] at least one armor ply. The anode is placed in an intermediate region of the flexible pipe distal from the [said] end fittings[, the]. A connection means [connecting] connects the anode to at least one of the metal wires of the said armor ply in the [said] intermediate region.